Contaminated Area and Media Management Plan Terminal 5 Upland Facility

Port of Portland
Portland, Oregon

February 6, 2006

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Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants
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engineers, scientists, economists

Contaminated Area and Media Management Plan Terminal 5 Upland Facility

Port of Portland
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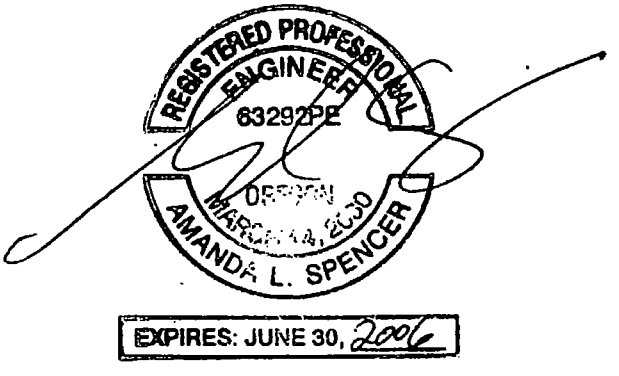
Respectfully submitted,



Amanda L. Spencer, P.E.
Principal Hydrogeologist, Ash Creek Associates

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1. Introduction

This contaminated area and media management plan (CAAMMP) was prepared to instruct Port of Portland (Port) staff, tenants, or contractors on proper handling of soil or groundwater potentially containing contaminants of interest (COI) in the area consisting of the southeast portion of Terminal 5 (the Restricted Area – defined differently for soil and groundwater) and, specifically in relation to the Portland Bulk Terminals (PBT) Facility Expansion Project to instruct PBT's employees and contractors on proper handling of soil or groundwater potentially containing COI. The restrictions defined in this CAAMMP apply only in the Restricted Area. Management of Terminal 5 environmental media outside the Restricted Area remains covered by existing leases and applicable laws and regulations.

1.1 Facility Location and Description

Terminal 5 is located on the east bank of the lower Willamette River just upstream from the confluence with the Columbia River (Figure 1). Figure 2 is a site plan depicting the southeast portion of Terminal 5 constituting the Restricted Area covered by the CAAMMP. Figure 3 depicts the Restricted Area in relation to the area of construction associated with the PBT Facility Expansion Project.

1.2 Use of the CAAMMP

This CAAMMP is intended to provide instruction regarding certain activity restrictions and soil and groundwater handling requirements at the Restricted Areas. The Restricted Areas are those portions of Terminal 5 where soil or groundwater may contain constituents of interest above background concentrations. Section 2 provides information to assist with health and safety requirements, disposal options, and treatment requirements. Sections 3, 4, and 5 address requirements potentially applicable to all activities within the Restricted Areas. Section 6 specifically addresses management requirements regarding the current PBT Facility Expansion Project. Other than for the PBT Facility Expansion Project addressed in Section 6, at the beginning of any project that potentially impacts the Restricted Area, the Port shall designate – as between itself, its tenants, and any contractors – who will be primarily responsible for the implementation of each of the requirements of this CAAMMP. In addition, tenants' environmental media management activities are governed by their leases and applicable laws and regulations.

The CAAMMP should be used as follows:

- **Construction Activities in the Restricted Area.** Fill material constituting "clean fill" or "substantially the same as clean fill" under Oregon law, including OAR 340-093, may be managed anywhere on site outside of both Restricted Areas depicted on Figure 2 without any restrictions. Any construction activities in the soil Restricted Area depicted on Figure 2 that involve disturbing the land below elevation 33 feet (approximately one foot below existing ground surface) must comply with the soil management requirements specified below in Section 3. Any construction activities in the groundwater Restricted Area depicted on Figure 2 that involve disturbing groundwater must comply with the groundwater management requirements specified below in Section 4.

- **Soil.** Handling of soil is discussed in Section 3. Soil within the soil Restricted Area above elevation 33 feet is considered clean soil and may be managed without any restrictions. Soil below elevation 33 feet in the soil Restricted Area (Restricted Soil) must be characterized to determine appropriate handling and disposal requirements. Such characterization may be completed in situ or after excavation (Section 3.1.1 or 3.1.2, respectively). In either case, until Restricted Soil is characterized, it shall be assumed to contain constituents of interest above safe levels and the training and health and safety guidelines in Section 5 shall be followed. Handling of soil with COI is discussed in Section 3.2. Selection of appropriate disposal options is presented in Section 3.3. Following characterization, handling, placement, and/or disposal of soil, in addition to complying with any permit requirements, a report of relevant information must be prepared and submitted to the Department of Environmental Quality (DEQ) Voluntary Cleanup Program Section per Section 3.4.

- **Groundwater.** Handling of groundwater is discussed in Section 4. Unless future information indicating the presence of a hazardous substance release becomes available, groundwater outside the area depicted on Figure 2 may be assumed to be not impacted by historical activities within the Restricted Area and may be managed without any restrictions. Groundwater within the groundwater Restricted Area (Restricted Groundwater) depicted on Figure 2 must be managed as follows. Using the data provided in Appendix A (together with any additional data subsequently collected), treatment and disposal of Restricted Groundwater shall be designed prior to construction as needed to meet applicable discharge permit requirements. Unless testing shows otherwise, Restricted Groundwater shall be assumed to contain constituents of interest above acceptable levels and the training and health and safety guidelines in Section 5 shall be followed. After groundwater handling in accordance with this CAAMMP, in addition to complying with any permit requirements, a letter report of relevant information must be submitted to the DEQ Voluntary Cleanup Program Section as presented in Section 4.3.

2. Background

2.1 Facility History

Prior to development in the Terminal 5 area, a pond was present in the vicinity of the current south Terminal 5 boundary. Most of this pond was on land owned by Oregon Steel Mills (OSM). OSM operates a steel mill on the land immediately south of Terminal 5. In the 1960s and 1970s, OSM filled the pond (from the south, on land now owned by OSM) until it was reduced to the extent shown on Figure 2. In 1975, the land that included the remnant pond was purchased from the Port by OSM. From 1975 to 1994, OSM extracted water from the pond to cool steel slag. Excess cooling water runoff was returned to the pond. The Port repurchased the land in 1981 to expand Terminal 5. Between 1988 and 1996, the pond was filled (in several phases) to current grade (Hahn and Associates, 1999).

The cooling water entering the pond from OSM elevated the water pH. The alkaline pH conditions promoted the precipitation of metal salts, resulting in an amorphous, white sediment (Century West, 1994). As a result, the pond often had an intense blue or green color and was referred to as the "Blue Lagoon." The sediment deposited at the base of the pond was buried beneath sand fill when this area was brought to grade.

2.2 Prior Investigations

Several phases of investigation were conducted in the area of the Blue Lagoon to assess for the presence of chemicals in the residual sediments and the potential impact the sediment had on surrounding soil and groundwater. Studies with analytical data included:

- 1993 Facility Investigation – Century West Engineering installed four groundwater monitoring wells (MW-1 through MW-4) and sampled lagoon water, sediment, soil, and groundwater (Century West, 1994).
- 1995 Facility Investigation – PTI Environmental Services sampled lagoon water, sediment, groundwater, and background soil (PTI, 1995).
- Groundwater Monitoring – Groundwater samples were collected from the monitoring wells on eight occasions between October 1993 and December 2005 (Hahn and Associates, 1999, BBL/Ash Creek/Newfields, 2006).

Soil and groundwater data from these studies are summarized below.

Soil. Soil data from prior studies are summarized in Table 1. Copies of historical data tables are included in Appendix A. The data set includes three surface soil samples, six subsurface soil samples (collected from depths ranging from 3.5 to 20 feet below ground surface), and eight sediment samples from the lagoon. The sediment sample data now represent a thin layer (estimated at 4 to 8 inches; PTI, 1995) of sediment buried when the lagoon was filled. The depth of these sediments is unknown, but the sediments are likely within the range of elevation 15 to 33 feet.

Soil samples were analyzed for total metals, leachable metals, pesticides, PCBs, herbicides, petroleum hydrocarbons, and volatile organic compounds. Pesticides, herbicides, petroleum hydrocarbons, and volatile organic compounds were not detected. Metals and PCBs were detected above background concentrations in samples collected from the former lagoon sediment. Metals and PCBs are therefore identified as COI in soil.

Groundwater. Groundwater data from prior studies are summarized in Table 2. Copies of historical data tables are included in Appendix A. The data set includes analytical results from four monitoring wells sampled eight times between 1993 and 2005 (except MW-1 was sampled only three times between 1993 and 1996 because it was abandoned during rail construction in 1996).

Groundwater samples were screened for pH and analyzed for total and dissolved metals, pesticides, PCBs, herbicides, oil and grease, and volatile organic compounds. Pesticides, PCBs, herbicides, oil and grease, and volatile organic compounds were not detected. Metals were detected and are therefore identified as COI in groundwater.

2.3 Preliminary Assessment

On September 7, 2000, the Port submitted a Preliminary Assessment of Terminal 5 to the DEQ. The Preliminary Assessment was prepared in response to a request by the DEQ. The DEQ commented on the Preliminary Assessment in a letter to the Port dated March 14, 2005. Item 2 of the letter requested management of buried sediment in the southeast portion of Terminal 5. This plan was prepared to address that comment.

2.4 PBT Facility Expansion Project

In 1996, a potash exportation facility was constructed on a portion of Terminal 5. PBT now owns that facility and is planning to expand. The PBT Facility Expansion Project will extend the existing potash building south into the Restricted Areas. The proposed work activities and project-specific requirements related to the PBT Facility Expansion Project are discussed in Section 6.

3. Soil Management

This section discusses special soil management requirements related to potential COI in soil in the Restricted Area (soil). Minimum health and safety requirements are discussed in Section 5. These requirements are in addition to all requirements that may be imposed on construction projects under federal, state, or local regulations.

Applicability. The requirements of this plan shall apply to all soil within the Restricted Area (soil) shown on Figure 2 and beneath elevation 33 feet (i.e., Restricted Soil). This zone corresponds to the volume that may contain historical sediments from the former lagoon. All of the Restricted Soil shall be assumed to contain COI unless sampling in accordance with generally accepted environmental practices demonstrates that the soil is suitable for unrestricted use.

Soil management shall consist of the following steps:

1) Characterize the Restricted Soil to be disturbed in accordance with Section 3.1
   a) If COI are equal to or less than background (see Table 1; use the detection limit as "background" for PCBs), no special handling is required and skip to Step 4
   b) If COI are present above background, proceed to Step 2
2) Handle Restricted Soil in accordance with the requirements in Section 3.2
3) For final disposition of excavated Restricted Soil, follow the requirements of Section 3.3
4) Prepare and submit report in accordance with Section 3.4

3.1 Characterization of Restricted Soil

All Restricted Soil to be disturbed by construction activities shall be characterized for proper handling and disposition. Characterization may be conducted either prior to construction or after excavation.

3.1.1 Characterization Prior to Construction

Soil samples shall be collected at a frequency and using procedures in accordance with generally accepted environmental practices at the time of the work. At a minimum, soil samples shall be analyzed for Priority Pollutant metals (EPA Method 6000/7000 series) and PCBs (EPA Method 8082). The potential disposal facility should be contacted for any other testing that may be required for acceptance for disposal (if off-site disposal is desired or required by Section 3.3).

3.1.2 Characterization After Excavation

If Restricted Soil is characterized after excavation, the soil shall be presumed to contain COI as summarized in Table 1 and Appendix A until testing demonstrates otherwise. The soil shall be handled in accordance with Section 3.2 and under the requirements of Section 5.

Stockpiles shall be sampled at a frequency of one sample per 100 cubic yards of soil using procedures in accordance with generally accepted environmental practices at the time of the work. At a minimum, soil samples shall be analyzed for Priority Pollutant metals (EPA Method 6000/7000

series) and PCBs (EPA Method 8082). The potential disposal facility should be contacted for any other testing that may be required for acceptance for disposal.

3.2 Handling of Soil with COI Above Background

Until demonstrated otherwise, all Restricted Soil shall be presumed to contain COI and shall be handled in accordance with the procedures in this section. The procedures in this section are in addition to the normal requirements for handling soil without COI.

Soil Excavation. Excavated Restricted Soil that may or does contain COI shall be maintained within the limits of the excavation, or it will be placed immediately into a waiting truck or a stockpile. During excavation, the soil should be observed for the distinctive white color characteristic of the sediment of the former lagoon. If observed, this soil with visible sediment should be stockpiled separately from other soil.

Stockpiling. Excavated Restricted Soil that is not immediately removed from the Facility (in accordance with the requirements of Section 3.3) shall be placed in a covered roll-off box or placed in a stockpile. Stockpiles at all times will be kept so as to prevent runon or erosion of the stockpiles. Stockpiles shall be placed on plastic sheeting (6-mil minimum), with a berm around the perimeter of the stockpile. The berm may be constructed by laying the bottom plastic over Jersey Barriers, ecology blocks or by other equivalent methods; however, in order to meet the strict quarantine regulations of Australia for the export of potash to Australia, no seeds or seed-containing products are allowed on the terminal, therefore straw bales may not be used for berm construction at the site. When not active, stockpiles shall be covered with plastic and secured with sand bags or equivalent. The soil shall remain in the stockpiles until testing is completed and final disposition is determined, but in no case shall soil be stockpiled for a period greater than three months. Once sampled, no soil shall be added to a stockpile.

Loading and Hauling. Excavated Restricted Soil may be loaded into trucks for hauling to a disposal facility or a temporary stockpile. During loading, care shall be taken to minimize spillage of soil on the exterior of the trucks or clean ground surface. Any soil on the truck exterior shall be removed prior to leaving the loading area. The trucks shall be covered with a tarp prior to departing the Facility. Trucks shall not be allowed to leave the Facility if liquids are draining from the load. Excavated soil shall be transported in accordance with appropriate Department of Transportation regulations.

3.3 Final Disposition of Soil

The results of the characterization testing (Section 3.1) shall be used to determine the final disposition of excavated Restricted Soil, as follows.

- All COI concentrations are less than background for metals (Table 1) and below method detection limits for PCBs – This plan places no restrictions on the use of the soil.
- All COI concentrations are less than Industrial Screening Levels (Table 1), but at least one COI concentration is greater than background – The soil may be re-used at the Facility provided that it doesn't result in storm water concentrations that exceed applicable standards (e.g., it can not be placed in erosional areas near unprotected stormwater inlets).

- At least one COI concentration exceeds Industrial Screening Levels – The soil shall be properly designated and disposed of in a licensed disposal facility.

The Industrial Screening Levels were obtained from the October 2004 EPA Region 9 Preliminary Remediation Goals (PRGs). These PRGs are periodically updated, and the PRGs current at the time of the work shall be used for the screening levels (see http://www.epa.gov/region9/waste/sfund/prg/ for updated tables).

3.4 Reporting

A brief letter report shall be prepared presenting the results of all sampling, chemical analysis, and soil disposition. At a minimum, the letter report will include:

- Site plan showing soil sample locations;
- Summary tables of analytical results;
- Discussion of field observations and results;
- Documentation of quantities and final disposition of soil, including a site plan if soil is left at the Facility;
- Copies of soil disposal receipts; and
- Analytical laboratory reports.

The letter report shall reference ECSI Site #1686 and shall be submitted to the DEQ VCP Section within 90 days of substantial completion of subsurface activities.

4. Groundwater Management

This section discusses special management requirements related to groundwater with COI within the groundwater Restricted Area. Minimum health and safety requirements are discussed in Section 5. These requirements are in addition to all requirements that may be imposed on construction projects under federal, state, or local regulations.

Applicability. The requirements of this plan shall apply to all groundwater within the Restricted Area (groundwater) shown on Figure 2 (i.e., Restricted Groundwater). The Restricted Area for groundwater was determined based on estimated influence of a typical excavation. The typical excavation was assumed to be up to 10 feet deep (e.g., footings, utilities). Using a correlation for distance of influence for dewatering excavations developed by the Corps of Engineers, the capture zone for a dewatering system would be about 50 feet. A safety factor of two was applied, so the boundary of the Restricted Area for groundwater was defined to be 100 feet beyond the monitoring wells.

To the extent the Port or one of its tenants uses groundwater outside (or inside) the Restricted Area for whatever purpose other than related to construction dewatering, the Port and/or tenant will do so in a manner that does not contribute to or exacerbate any pre-existing hazardous substance releases in the former Blue Lagoon Area.

4.1 Characterization of Groundwater

All Restricted Groundwater to be encountered by construction activities shall be characterized for proper handling and disposition. Restricted Groundwater shall be presumed to contain COI as summarized in Table 2 and Appendix A until testing demonstrates otherwise.

4.2 Handling of Restricted Groundwater

Until demonstrated otherwise, all Restricted Groundwater shall be presumed to contain COI and shall be handled in accordance with the procedures in this section. The procedures in this section are in addition to the normal requirements for handling groundwater without COI.

Discharges from dewatering systems normally discharge to surface water (e.g., storm sewer), sanitary sewer, or the ground surface. Each of these options requires a permit from the DEQ (surface water, ground surface) or City of Portland (sanitary sewer). The discharge permits may or may not require treatment prior to discharge. The corresponding regulatory authority shall be contacted for the discharge requirements. Dewatering systems shall be installed and operated in a manner that allows treatment and testing of water prior to discharge. This can be achieved by either batch testing and discharge or continuous flow treatment systems with regular discharge testing. Treatment and testing requirements shall be in accordance with the requirements of the corresponding discharge permit.

PBT's facility at Terminal 5 is subject to a Storm Water General Permit (1200-Z) under the National Pollutant Discharge Elimination System program administered in Oregon by DEQ. This permit "does

not authorize the discharge or on-site disposal of process waste water ... or any other non-storm discharges associated with the facility" (Schedule A, Item 4). Therefore, incidental seepage of groundwater as a result of construction activities shall be prevented from flowing into the storm water system or shall be addressed under the regulatory processes discussed above.

4.3 Reporting

In addition to complying with any other applicable regulatory requirements, a brief letter report shall be prepared presenting the results of all sampling, chemical analysis, and groundwater pumping/ treatment/discharge. At a minimum, the report will include:

- Site plan showing sample locations, dewatering wells, treatment system, and discharge point;
- Summary tables of analytical results;
- Brief discussion of field observations and results;
- Copies of discharge permit; and
- Analytical laboratory reports.

The report shall reference ECSI Site #1686 and shall be submitted to the DEQ VCP Section within 90 days of substantial completion of dewatering activities.

5. Health and Safety Training and Planning

This section addresses health and safety and training in addition to that normally conducted for construction activities. Any party completing any activity at the Facility that potentially will result in employee exposure to media containing COI must comply with the following requirements.

1. Training. All employees engaged in activities that include exposure to media containing COI above risk-based health levels must be trained in accordance with 29 CFR 1910.120. Training will not be required for work areas that have been characterized (prior to the work activities) and shown not to pose a risk to workers.

2. Health and Safety Plan. The party in charge of the site activity shall prepare and implement a Health and Safety Plan (HSP) in accordance with OSHA (29 CFR 1910.120) and Oregon Administrative Rules. The HSP shall be prepared by a Certified Industrial Hygienist. The HSP shall identify and address, but not be limited to, the physical and chemical hazards of the site and the proposed activities. The HSP content shall, at a minimum, include the following:

- Personal protective equipment including respiratory protection;
- Site safety supervisor;
- Action levels at which protection would be upgraded;
- Controls to be used to minimize worker exposure to hazardous substances;
- Exclusion, contamination reduction, and clean zones;
- Personnel decontamination procedures;
- Route to hospital; and
- Monitoring equipment to be employed.

6. Portland Bulk Terminals Expansion Project

This section discusses the requirements for contaminated area and media management to instruct designated responsible persons regarding the PBT Expansion Project on proper handling of soil or groundwater potentially containing contaminants of interest (COI). To the extent not in conflict with the project-specific discussion in this section, all requirements of the entire CAAMMP apply to the PBT Expansion Project. The restrictions defined in this CAAMMP apply only in the area consisting of the southeast portion of Terminal 5 (the Restricted Areas).

Any proposed use of groundwater by PBT in leased areas outside of the Restricted Areas is subject to the Port's review and approval under the "Permitted Use" and/or the "Port Approval" of "Lessee Improvements" provisions of the Ground Lease – Bulk Cargo Facility/Terminal 5, as amended." The Port will consider any such proposed use of groundwater so as to assure that such use does not exacerbate or contribute to any pre-existing hazardous substance releases in the former Blue Lagoon Area.

6.1 PBT Facility Expansion Project

The PBT Facility Expansion Project has two parts: rail expansion and building expansion. The Port will lead rail expansion, and the work will consist of rail installation, utility work, and drainage ditch work. The general area of the rail expansion work is shown on Figure 3. The rail work is not expected to encounter groundwater. Approximately 1000 lineal feet of new track and 800 lineal feet of new access road will cross the soil Restricted Area.

PBT will lead the building expansion. The project will extend the existing potash building approximately 610 feet to the south. The proposed expansion footprint is shown on Figure 3. The expanded building will extend into the Restricted Areas (about 100 feet into the soil Restricted Area and about 300 feet into the groundwater Restricted Area).

In general, project site work activities will include placement and removal of surcharge, footing excavation, drainage work, and site grading. Footing excavations may require local dewatering. These activities will/may impact soil or groundwater within the Restricted Areas. The first phase of the project will consist of a site surcharge (or preload) placed on the project site to induce settlement in underlying soil prior to project construction. The specifications/drawings for the site surcharge and grading were prepared by Kleinfelder and are reproduced for reference in Appendix B.

6.2 Contaminated Media Management Responsibilities During the PBT Expansion Project

The Port is the property owner and is ultimately responsible to the DEQ for proper implementation of the CAAMMP. It is the Port's responsibility to communicate the requirements of the CAAMMP and to ensure it is incorporated into the building project design. Port staff will provide general oversight and will work jointly with PBT and a designated consultant and/or contractor to ensure the CAAMMP is properly implemented including assuring that:

- All permits and regulatory approval associated with water discharges and/or soil disposal are obtained;
- Soil and/or groundwater sampling, handing, treatment, or disposal are implemented; and
- Reports are prepared for submittal to DEQ.

6.3 PBT Expansion Project Specific Requirements

6.3.1 Soil

During the PBT Expansion Project, excavation (e.g., footing excavations, utility removal) or site grading are likely to disturb some soil within the Restricted Area. All soil handling will be conducted in accordance with the requirements in Section 3.

6.3.2 Groundwater

During the PBT Expansion Project, groundwater may be encountered during excavating (e.g., dewatering of footing excavations) or during preloading. Preloading increases stress in the subsurface which may temporarily increase the groundwater levels. Although very unlikely, increased groundwater levels may manifest as seepage at the ground surface.

Groundwater from dewatering of excavations shall be handled in accordance with Section 4.2.

Incidental seepage of groundwater may be indistinguishable from storm water runoff or naturally high groundwater levels. Therefore, the potential for increased groundwater levels will be evaluated by monitoring water levels in the three on-site monitoring wells (MW-2, MW-3, and MW-4). Data will be collected daily beginning one day prior to placement of the preload and continuing during preload placement. The data will be evaluated for increases in water level above natural variations (by comparing changes in water levels to timing of preload placement and rainfall, and using MW-2 as a "background" well). If increases in water levels are identified that are attributable to preload placement, a check dam will be constructed from sand bags at the discharge end of the perimeter drainage ditch. The check dam will pond accumulated groundwater but allow the overflow of storm water during rain events. The check dams will be removed after groundwater levels return to normal levels.

7. References

BBL/Ash Creek/Newfields, 2006. Groundwater Monitoring Report, December 2005, Terminal 5 Upland Facility, January 2006.

Century West, 1994. Preliminary Site Assessment for the Blue Lagoon, Terminal 5. February 4, 1994.

Hahn and Associates, 1999. Groundwater Monitoring Report, Port of Portland, "Blue Lagoon" Site, Terminal 5, Portland, Oregon. December 22, 1999.

PTI Environmental Services, 1995. Site Characterization for the "Blue Lagoon" at Marine Terminal 5. April 1995.

TABLE 1
SOIL SAMPLE RESULTS

CONTAMINATED MEDIA MANAGEMENT PLAN
PORT OF PORTLAND - TERMINAL 5

Contaminant of Interest	Detection Frequency	Maximum Detection	Location	Background[6]	Screening Levels[4] Industrial
Total Metals (mg/kg)					
Antimony	0 / 10	<10	--	5	410
Arsenic	12 / 18	8.11	SD1-4	5.8	1.6
Barium	18 / 18	907	SS-1	57 [7]	67000
Cadmium	5 / 18	1.9	SD2-0	0.9	450
Chromium	18 / 18	236	SD1-0	26	450
Copper	10 / 10	112	SD1-0	34	41000
Lead	15 / 18	82.3	SD2-0	17	800
Mercury	14 / 18	0.261	SD1-4	0.04	310
Nickel	7 / 10	46.9	SD1-0	21	20000
Selenium	0 / 11	<5	--	0.8	5100
Silver	0 / 18	<1.5	--	0.6	5100
Zinc	10 / 10	550	SD1-0	95	100000
Extractable Metals (mg/L)					
Antimony	0 / 8	<0.1	--	--	--
Arsenic	0 / 8	<0.25	--	--	--
Barium	3 / 8	3.9	SD2-0	--	--
Cadmium	0 / 8	<0.1	--	--	--
Chromium	0 / 8	<0.1	--	--	--
Copper	0 / 8	<0.1	--	--	--
Lead	0 / 8	<0.13	--	--	--
Mercury	0 / 8	<0.01	--	--	--
Nickel	0 / 8	<0.1	--	--	--
Silver	0 / 8	<0.1	--	--	--
Zinc	7 / 8	1.16	SD1-0	--	--
Organochlorine Pesticides					
All pesticides	0 / 7	--	--	--	--
Polychlorinated Biphenyls (µg/kg)					
Aroclor-1016	0 / 7	<50	--	--	21000
Aroclor-1221	0 / 7	<50	--	--	21000
Aroclor-1232	0 / 7	<50	--	--	21000
Aroclor-1242	0 / 7	<50	--	--	21000
Aroclor-1248	3 / 7	10000	SD1-0 (dup)	--	740
Aroclor-1254	0 / 7	<50	--	--	740
Aroclor-1260	0 / 7	<50	--	--	740
Chlorinated Herbicides					
All chlorinated herbicides	0 / 7	--	--	--	--
Total Petroleum Hydrocarbons					
All petroleum hydrocarbons	0 / 7	--	--	--	--
Volatile Organic Compounds					
All volatile organic compounds	0 / 7	--	--	--	--

Notes:

1) mg/kg = Milligram per kilogram.

2) mg/L = Milligram per liter.

3) µg/kg = Microgram per kilogram.

4) Screening levels: EPA Region 9 PRGs (October 2004).

5) -- = Not applicable or not available.

6) Washington Dept. of Ecology, *Natural Background Soil Metals Concentrations in Washington State* (October 1994); Clark County values.

7) Source: PTI, 1995; Background levels for barium not available in Washington Department Ecology (1994) document.

TABLE 2
GROUNDWATER SAMPLE RESULTS

CONTAMINATED MEDIA MANAGEMENT PLAN
PORT OF PORTLAND - TERMINAL 5

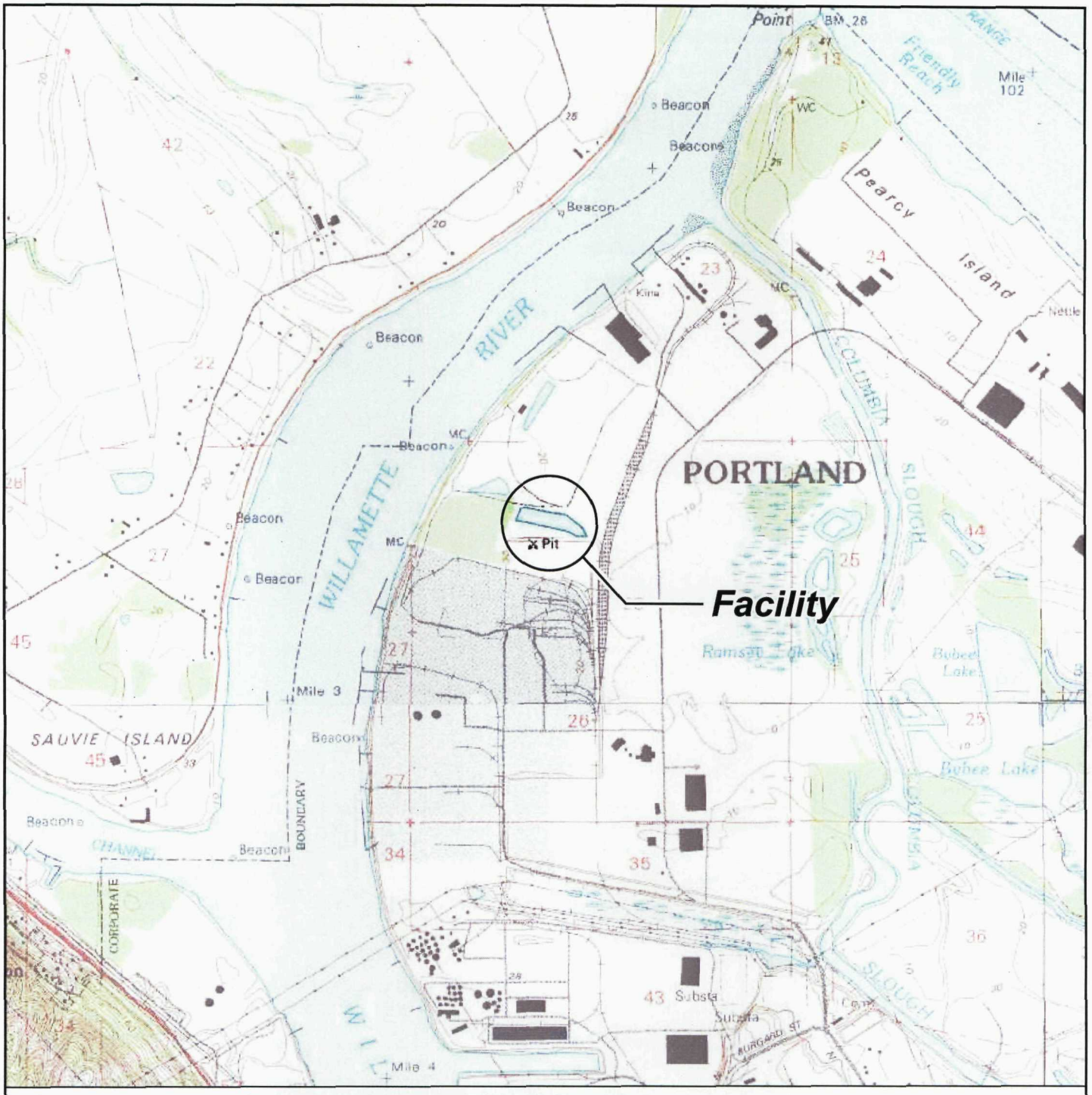
Contaminant of Interest	Detection Frequency	Maximum Detection	Location
Total Metals (mg/L)			
Antimony	0 / 12	<0.05	--
Arsenic	17 / 24	0.092	MW-4
Barium	27 / 27	2.03	MW-2
Cadmium	1 / 24	0.0023	MW-4
Chromium	10 / 24	0.274	MW-1
Copper	13 / 24	0.217	MW-4
Iron	15 / 15	71.8	MW-4
Lead	7 / 24	0.12	MW-2
Manganese	15 / 15	7.85	MW-4
Mercury	4 / 24	0.0012	MW-2
Nickel	10 / 24	0.152	MW-4
Silver	0 / 12	<0.01	--
Zinc	10 / 24	0.658	MW-2
pH			
pH	--	11.0	MW-1
Organochlorine Pesticides			
All pesticides	0 / 4	--	--
Polychlorinated Biphenyls			
All PCBs	0 / 4	--	--
Chlorinated Herbicides			
All chlorinated herbicides	0 / 4	--	--
Total Petroleum Hydrocarbons			
Oil & Grease	0 / 4	--	--
Volatile Organic Compounds			
All volatile organic compounds	0 / 4	--	--

Notes:

1) mg/L = Milligram per liter.

2) -- = Not applicable or not available.

3) Sources: Hahn and Associates, 1999; PTI, 1995; BBL/Ash Creek/Newfields, 2006.



Base map prepared from USGS 7.5-minute quadrangles as provided by Topozone.

0 2000 4000

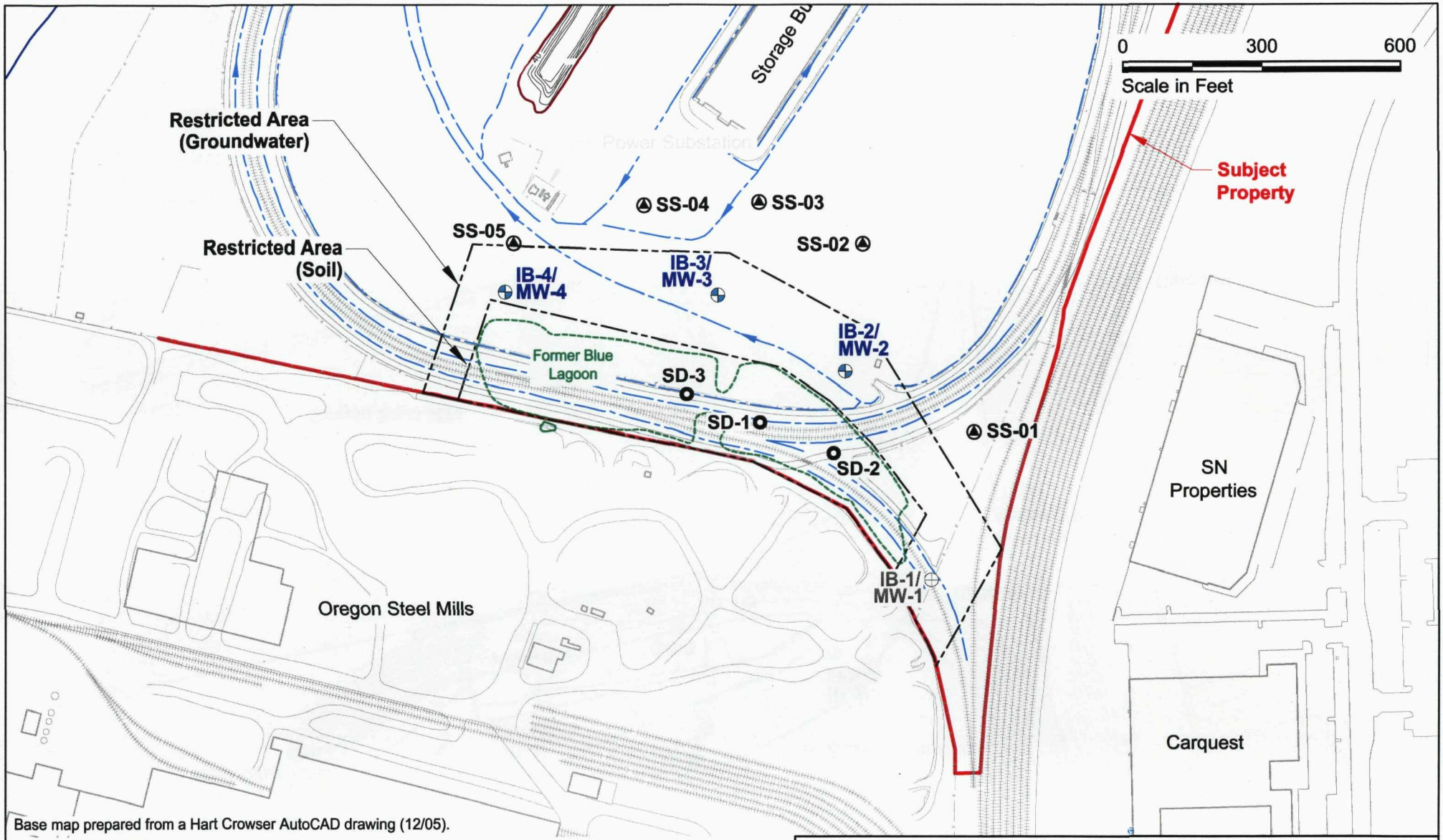
Scale in Feet

N

Facility Location Map

Contaminated Area and Media Management Plan
Port of Portland - Terminal 5 Upland Facility
Portland, Oregon

Ash Creek Associates, Inc. Environmental and Geotechnical Consultants	Project Number 1092-01	Figure 1
	January 2006	



Facility Plan

Contaminated Area and Media Management Plan
Port of Portland - Terminal 5 Upland Facility
Portland, Oregon

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1092-01	Figure
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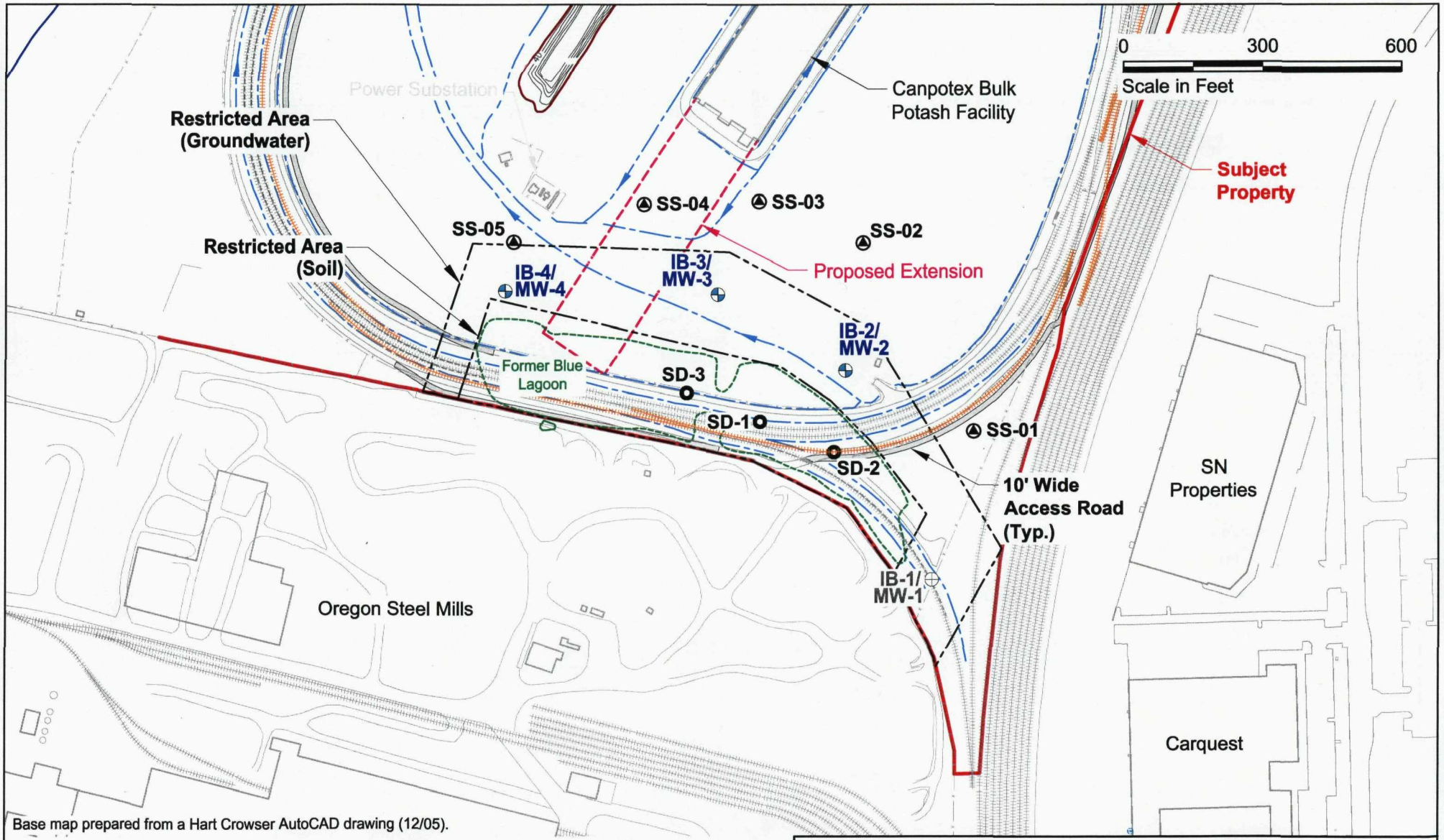

Base map prepared from a Hart Crowser AutoCAD drawing (12/05).

Legend:

- IB-4/ MW-4 — Investigative Borehole/Monitoring Well Location
- IB-1/ MW-1 — Abandoned Investigative Borehole/Monitoring Well Location
- SS-01 — Background Soil Sampling Location
- SD-1 — Sediment Core Sampling Location
- Phase 1 New Track
- Remove Existing Track
- Ditch

PBT Expansion Project Facility Plan

Contaminated Area and Media Management Plan
Port of Portland - Terminal 5 Upland Facility
Portland, Oregon

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1092-01	Figure
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Appendix A

Historical Soil and Groundwater Data

TABLE 1. TOTAL AND TCLP–EXTRACTABLE METALS RESULTS FOR BACKGROUND SOIL

	SS–01	SS–02	SS–03	SS–04	SS–05	PSI Background Results[a]
Total Metals (mg/kg)						
Antimony	2.0 *U*	2.0 *U*	2.0 *U*	2.0 *U*	2.0 *U*	2 *U*
Arsenic	5.0 *U*	5.0 *U*	5.0 *U*	5.0 *U*	5.0 *U*	2.1
Barium	50.8	46.8	53.0	63.4	50.8	46.3
Cadmium	0.2 *U*	0.2 *U*	0.2 *U*	0.33	0.2 *U*	0.2 *U*
Chromium	13.9	15.2	14.2	16.7	12.8	11.1
Copper	7.82	8.33	8.20	14.0	6.98	6.97
Lead	4.2	2.7	2.5 *U*	10.6	3.0	2.6
Mercury	0.02 *U*	0.02 *U*	0.02 *U*	0.045	0.02 *U*	0.02 *U*
Nickel	9.73	10.3	9.88	12.5	8.28	49
Selenium	NA	NA	NA	NA	NA	5 *U*
Silver	0.3 *U*	0.3 *U*	0.3 *U*	0.3 *U*	0.3 *U*	0.3 *U*
Zinc	34.7	27.7	31.1	52.6	40.9	31.3
TCLP–Extractable Metals[b] (mg/L)						
Antimony	--	--	--	--	--	0.01 *U*
Arsenic	--	--	--	--	--	0.01 *U*
Barium	--	--	--	--	--	1 *U*
Cadmium	--	--	--	--	--	0.01 *U*
Chromium	--	--	--	--	--	0.01 *U*
Copper	--	--	--	--	--	0.01 *U*
Lead	--	--	--	--	--	0.01 *U*
Mercury	--	--	--	--	--	0.02 *U*
Nickel	--	--	--	--	--	0.01 *U*
Selenium	--	--	--	--	--	0.01 *U*
Silver	--	--	--	--	--	0.01 *U*
Zinc	--	--	--	--	--	0.147

Note: NA – not analyzed
TCLP – toxicity characteristics leaching procedure

Qualifier: *U* – undetected at detection limit shown

[a] Data from Century West (1994)
[b] TCLP–extractable metals not analyzed for by PTI

CA4A010\Table1.WK1

TABLE 2. ORGANOCHLORINE PESTICIDE, CHLORINATED HERBICIDE, AND HYDROCARBON RESULTS FOR BACKGROUND SOIL

	SS-01	SS-02	SS-03	SS-04	SS-05
Organochlorine Pesticides (µg/kg)					
Aldrin	8 U	8 U	8 U	8 U	8 U
alpha-HCH	8 U	8 U	8 U	8 U	8 U
beta-HCH	8 U	8 U	8 U	8 U	8 U
delta-HCH	8 U	8 U	8 U	8 U	8 U
gamma-HCH (Lindane)	8 U	8 U	8 U	8 U	8 U
Chlordane (technical)	80 U	80 U	80 U	80 U	80 U
4,4'-DDE	8 U	8 U	8 U	8 U	8 U
4,4'-DDD	16 U	16 U	16 U	16 U	16 U
4,4'-DDT	16 U	16 U	16 U	16 U	16 U
Dieldrin	8 U	8 U	8 U	8 U	8 U
Endosulfan I	8 U	8 U	8 U	8 U	8 U
Endosulfan II	16 U	16 U	16 U	16 U	16 U
Endosulfan sulfate	16 U	16 U	16 U	16 U	16 U
Endrin	16 U	16 U	16 U	16 U	16 U
Endrin aldehyde	32 U	32 U	32 U	32 U	32 U
Endrin ketone	16 U	16 U	16 U	16 U	16 U
Heptachlor	8 U	8 U	8 U	8 U	8 U
Heptachlor epoxide	8 U	8 U	8 U	8 U	8 U
Methoxychlor	32 U	32 U	32 U	32 U	32 U
Toxaphene	160 U	160 U	160 U	160 U	160 U
Chlorinated Herbicides (µg/kg)					
2,4-D	800 U	800 U	800 U	800 U	800 U
2,4-DB	600 U	600 U	600 U	600 U	600 U
2,4,5-T	130 U	130 U	130 U	130 U	130 U
2,4,5-TP	110 U	110 U	110 U	110 U	110 U
Dalapon	3900 U	3900 U	3900 U	3900 U	3900 U
Dicamba	180 U	180 U	180 U	180 U	180 U
Dichloroprop	440 U	440 U	440 U	440 U	440 U
Dinoseb	47 U	47 U	47 U	47 U	47 U
MCPA	170000 U	170000 U	170000 U	170000 U	170000 U
MCPP	130000 U	130000 U	130000 U	130000 U	130000 U
Hydrocarbons (mg/kg)					
Gasoline	20 U	20 U	20 U	20 U	20 U
Diesel	50 U	50 U	50 U	50 U	50 U
Oil/Bunker C	ND	ND	ND	ND	ND
Oil & Grease	250 U	250 U	270 U	250 U	250 U

Note: ND – not detected

Qualifier: U – undetected at detection limit shown

TABLE 5. TOTAL AND TCLP–EXTRACTABLE METALS RESULTS FOR SEDIMENTS

Analyte	SS–1[a]	SS–2[a]	SS–3[a]	SD1–0	SD1–2	SD1–4	SD2–0	SD2–2	SD2–4	SD3–0	SD3–2
Total Metals (mg/kg)											
Antimony	2 *U*	2 *U*	2 *U*	10 *U*	2 *U*	2 *U*	10 *U*	2 *U*	--	10 *U*	2 *U*
Arsenic	4.74	4.29	2.31	8.01	3.4	8.11	7.19	4.4	--	6.91	4.1
Barium	907	642	706	400	115	167	454	131	--	359	109
Cadmium	0.2 *U*	0.2 *U*	0.2 *U*	1.3	0.22	0.59	1.9	0.52	--	1 *U*	0.2 *U*
Chromium	21.3	75.9	77.4	236	20	31.2	80.4	20.9	--	73.9	16.4
Copper	18.5	38.4	28.1	112	17.4	38	38.4	20.7	--	33.7	15.4
Lead	2.5 *U*	17 *U*	42 *U*	72.2	9.5	25.3	82.3	15.2	--	49.0	7.1
Mercury	0.02 *U*	0.06 *U*	0.04 *U*	0.116	0.045	0.261	0.208	0.078	--	0.163	0.026
Nickel	1 *U*	22 *U*	6.2 *U*	46.9	16.2	23.3	18	15.4	--	21	15.9
Selenium	5 *U*	5 *U*	5 *U*	NA	NA	NA	NA	NA	--	NA	NA
Silver	0.3 *U*	0.3 *U*	0.3 *U*	1.5 *U*	0.3 *U*	0.3 *U*	1.5 *U*	0.3 *U*	--	1.5 *U*	0.3 *U*
Zinc	39.8	67.6	167	550	75.2	143	359	109	--	189	55.9
TCLP–Extractable Metals (mg/L)											
Antimony	--	--	--	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*
Arsenic	--	--	--	0.25 *U*	0.25 *U*	0.25 *U*	0.25 *U*	0.25 *U*	0.25 *U*	0.25 *U*	0.25 *U*
Barium	--	--	--	3.61	1 *U*	1 *U*	3.9	1 *U*	1 *U*	3.8	1 *U*
Cadmium	--	--	--	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*
Chromium	--	--	--	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*
Copper	--	--	--	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*
Lead	--	--	--	0.13 *U*	0.13 *U*	0.13 *U*	0.13 *U*	0.13 *U*	0.13 *U*	0.13 *U*	0.13 *U*
Mercury	--	--	--	0.01 *U*	0.01 *U*	0.01 *U*	0.01 *U*	0.01 *U*	0.01 *U*	0.01 *U*	0.01 *U*
Nickel	--	--	--	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*
Silver	--	--	--	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*	0.1 *U*
Zinc	--	--	--	1.16	0.16	0.64	0.38	0.65	0.21	0.24	0.1 *U*

Note: NA – not analyzed

Qualifier: *U* – undetected at detection limit shown

[a] Data from Century West (1994).

TABLE 6. TOTAL PESTICIDE AND PCB, CHLORINATED HERBICIDE, HYDROCARBON, AND OIL & GREASE RESULTS FOR SEDIMENTS

	SD1-0	SD1-2	SD1-4	SD2-0	SD2-2	SD3-0	SD3-2	SD1-0 (dup)
Total Pesticides (µg/kg)								
Aldrin	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
alpha-HCH	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
beta-HCH	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
delta-HCH	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
gamma-HCH (Lindane)	80 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U
Chlordane (technical)	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
4,4'-DDE	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
4,4'-DDD	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
4,4'-DDT	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Dieldrin	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Endosulfan I	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
Endosulfan II	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Endosulfan sulfate	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Endrin	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Endrin aldehyde	32 U	32 U	32 U	32 U	32 U	32 U	32 U	32 U
Endrin ketone	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Heptachlor	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
Heptachlor epoxide	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
Methoxychlor	80 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U
Toxaphene	160 U	160 U	160 U	160 U	160 U	160 U	160 U	160 U
Aroclor™-1016	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor™-1221	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor™-1232	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor™-1242	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor™-1248	7400	50 U	50 U	1400	50 U	1400	50 U	10000
Aroclor™-1254	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor™-1260	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U

TABLE 6. (Cont.)

	SD1-0	SD1-2	SD1-4	SD2-0	SD2-2	SD3-0	SD3-2
Chlorinated Herbicides (µg/kg)							
2,4-D	800 *U*	800 *U*	800 *U*	800 *U*	800 *U*	800 *U*	800 *U*
2,4,5-T	130 *U*	130 *U*	130 *U*	130 *U*	130 *U*	130 *U*	130 *U*
2,4,5-TP	110 *U*	110 *U*	110 *U*	110 *U*	110 *U*	110 *U*	110 *U*
Dalapon	3900 *U*	3900 *U*	3900 *U*	3900 *U*	3900 *U*	3900 *U*	3900 *U*
Dicamba	180 *U*	180 *U*	180 *U*	180 *U*	180 *U*	180 *U*	180 *U*
Dichloroprop	440 *U*	440 *U*	440 *U*	440 *U*	440 *U*	440 *U*	440 *U*
Dinoseb	47 *U*	47 *U*	47 *U*	47 *U*	47 *U*	47 *U*	47 *U*
MCPA	170000 *U*	170000 *U*	170000 *U*	170000 *U*	170000 *U*	170000 *U*	170000 *U*
MCPP	130000 *U*	130000 *U*	130000 *U*	130000 *U*	130000 *U*	130000 *U*	130000 *U*
Hydrocarbons and Oil & Grease (mg/kg)							
Gasoline	20 *U*	20 *U*	20 *U*	20 *U*	20 *U*	20 *U*	20 *U*
Diesel	50 *U*	50 *U*	50 *U*	50 *U*	50 *U*	50 *U*	50 *U*
Oil/Bunker C	ND	ND	ND	ND	ND	ND	ND
Oil & Grease	10 *U*	10 *U*	10 *U*	10 *U*	10 *U*	10 *U*	10 *U*

Note: ND – not detected

Qualifier: *U* – undetected at detection limit shown

TABLE 7. VOLATILE ORGANIC COMPOUND RESULTS FOR SEDIMENT

	SD1-0	SD1-2	SD1-4	SD2-0	SD2-2	SD3-0	SD3-2
Benzene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Bromodichloromethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Bromoform	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Bromomethane	30 U	30 U	30 U	30 U	30 U	30 U	30 U
2-Butanone	300 U	300 U	300 U	300 U	300 U	300 U	300 U
Carbon tetrachloride	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Chlorobenzene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Chloroethane	30 U	30 U	30 U	30 U	30 U	30 U	30 U
2-Chloroethyl vinyl ether	30 U	30 U	30 U	30 U	30 U	30 U	30 U
Chloroform	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Chloromethane	30 U	30 U	30 U	30 U	30 U	30 U	30 U
Dibromochloromethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,2-Dibromoethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,2-Dichlorobenzene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,3-Dichlorobenzene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,4-Dichlorobenzene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Dichlorodifluoromethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,1-Dichloroethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,2-Dichloroethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,1-Dichloroethene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
cis-1,2-Dichloroethene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
trans-1,2-Dichloroethene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,2-Dichloropropane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
cis-1,2-Dichloropropene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
trans-1,3-Dichloropropene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Ethylbenzene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
2-Hexanone	150 U	150 U	150 U	150 U	150 U	150 U	150 U
4-Methyl-2-pentanone	150 U	150 U	150 U	150 U	150 U	150 U	150 U
Dichloromethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,1,2,2-Tetrachloroethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Tetrachloroethene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Toluene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,1,1-Trichloroethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
1,1,2-Trichloroethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Trichloroethene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Trichlorofluoromethane	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Styrene	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Vinyl chloride	30 U	30 U	30 U	30 U	30 U	30 U	30 U
Total xylenes	15 U	15 U	15 U	15 U	15 U	15 U	15 U

Note: Results reported in µg/kg

Qualifier: *U* – undetected at detection limit shown

TABLE 8. PSI TOTAL METALS RESULTS FOR SUBSURFACE SOIL (CENTURY WEST)

	IB-1-9.0	IB-1-20.0	IB-2-3.5	IB-2-14.0	IB-3-7.0	IB-3-19.0	IB-4-9.0	IB-4-19.0
Arsenic	3.67	2 *U*	2 *U*	3.25	2 *U*	2 *U*	2 *U*	2 *U*
Barium	144	77.5	96.4	75.1	85.8	125	96.6	131
Cadmium	0.2 *U*	0.2 *U*	0.2 *U*	0.2 *U*	0.2 *U*	0.2 *U*	0.02 *U*	0.2 *U*
Chromium	24.8	15.7	17.6	14.8	18.3	20.9	30.7	21.1
Lead	8.7	4.3	6.7	4.8	3.9	6.8	13	7.7
Mercury	0.04	0.03	0.03	0.03	0.02 *U*	0.06	0.09	0.04
Selenium	5 *U*	5 *U*	5 *U*	5 *U*	5 *U*	5 *U*	5 *U*	5 *U*
Silver	0.3 *U*	0.3 *U*	0.3 *U*	0.3 *U*	0.3 *U*	0.3 *U*	0.3 *U*	0.3 *U*

Note: Results reported in mg/kg

Qualifier: *U* – undetected at detection limit shown

TABLE 4 - *Summary of Historical Analytical Results for Groundwater Monitoring Samples*
Total and Dissolved Metals, pH

"Blue Lagoon" Site
Port of Portland, Terminal 5
Portland, Oregon

Project #4339

Well Number	Sample Date	Sampled By	Analytical Results mg/l (ppm)														
			pH	Total Alkalinity	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc
Total (Unfiltered) Metals																	
MW-1	22-Oct-93	Century West	-	-	ND¹	0.068	0.558	ND¹	0.874	0.112	-	0.048	-	0.0002	0.0934	ND¹	0.326
	27-Feb-95	PTI	-	-	ND¹	ND¹	0.727	ND¹	0.16	0.0093	-	ND¹	-	ND¹	ND¹	ND¹	0.0085
	24-Apr-96	GeoEngineers	11.04	-	ND¹	0.009	0.58	ND¹	0.2	0.02	-	0.039	-	ND¹	ND¹	ND¹	0.01
MW-2	22-Oct-93	Century West	-	-	ND¹	0.091	2.03	ND¹	0.134	0.214	-	0.12	-	0.0012	0.193	ND¹	0.658
	27-Feb-95	PTI	-	-	ND¹	ND¹	0.101	ND¹	ND¹	0.002	-	ND¹	-	ND¹	ND¹	ND¹	ND¹
	24-Apr-96	GeoEngineers	6.15	-	ND¹	0.019	1.59	ND¹	0.16	0.2	-	0.06	-	0.0008	0.13	ND¹	0.63
	2-Oct-98	HAI	6.75	-	-	0.0099	0.0641	ND¹	ND¹	ND¹	16.5	ND¹	0.924	ND¹	ND¹	-	ND¹
	13-Apr-99	HAI	9.91	-	-	0.0036	0.0313	ND¹	ND¹	0.0021	2.37	ND¹	0.293	ND¹	ND¹	-	ND¹
	29-Jul-99	HAI	9.58	87.	-	0.0133	0.0145	ND¹	ND¹	0.0021	0.85	ND¹	0.097	ND¹	ND¹	-	ND¹
	19-Oct-99	HAI	9.0	94.	-	0.012	0.0236	ND¹	ND¹	ND¹	1.68	ND¹	0.235	ND¹	ND¹	-	ND¹
MW-3	22-Oct-93	Century West	-	-	ND¹	ND¹	0.234	ND¹	0.0394	0.0459	-	ND¹	-	ND¹	0.043	ND¹	0.174
	27-Feb-95	PTI	-	-	ND¹	ND¹	0.0079	ND¹	ND¹	ND¹	-	ND¹	-	ND¹	ND¹	ND¹	ND¹
	24-Apr-96	GeoEngineers	7.00	-	ND¹	0.008	0.12	ND¹	0.01	0.02	-	0.007	-	ND¹	ND¹	ND¹	0.07
	2-Oct-98	HAI	6.65	-	-	0.004	0.0091	ND¹	ND¹	ND¹	3.06	ND¹	0.606	ND¹	0.0026	-	ND¹
	13-Apr-99	HAI	7.02	-	-	0.002	0.0185	ND¹	ND¹	ND¹	5.	ND¹	0.608	ND¹	ND¹	-	ND¹
	29-Jul-99	HAI	6.67	71.	-	0.0049	0.0132	ND¹	ND¹	ND¹	6.95	ND¹	0.87	ND¹	ND¹	-	ND¹
	19-Oct-99	HAI	6.4	71.	-	0.0036	0.0105	ND¹	ND¹	ND¹	3.4	ND¹	0.572	ND¹	ND¹	-	ND¹
MW-4	22-Oct-93	Century West	-	-	ND¹	0.092	0.949	0.0023	0.138	0.217	-	0.216	-	0.0011	0.162	ND¹	0.646
	27-Feb-95	PTI	-	-	ND¹	ND¹	0.0513	ND¹	0.006	0.0063	-	ND¹	-	ND¹	ND¹	ND¹	ND¹
	24-Apr-96	GeoEngineers	6.00	-	ND¹	ND¹	0.09	ND¹	0.01	0.02	-	0.006	-	ND¹	ND¹	ND¹	0.05
	2-Oct-98	HAI	6.56	-	-	0.0104	0.0898	ND¹	ND¹	ND¹	41.6	ND¹	7.85	ND¹	0.0115	-	0.0077
	13-Apr-99	HAI	6.71	-	-	ND¹	0.0133	ND¹	ND¹	ND¹	1.83	ND¹	0.684	ND¹	0.002	-	ND¹
	29-Jul-99	HAI	6.38	316.	-	0.0037	0.0403	ND¹	ND¹	ND¹	7.97	ND¹	3.19	ND¹	0.0072	-	ND¹
	19-Oct-99	HAI	6.5	489.	-	0.0348	0.0896	ND¹	ND¹	ND¹	71.8	ND¹	7.4	ND>0.0004	0.01	-	ND¹
Dissolved (Filtered) Metals																	
MW-1	22-Oct-93	Century West	-	-	ND¹	ND¹	0.0295	ND¹	ND¹	ND¹	-	ND¹	-	ND¹	0.011	ND¹	ND¹
	27-Feb-95	PTI	-	-	ND¹	ND¹	0.566	ND¹	0.107	ND¹	-	ND¹	-	ND¹	ND¹	ND¹	ND¹
	24-Apr-96	GeoEngineers	-	-	ND¹	ND¹	0.61	ND¹	0.18	ND¹	-	0.004	-	ND¹	ND¹	ND¹	0.02
MW-2	22-Oct-93	Century West	-	-	ND¹	0.067	0.18	ND¹	ND¹	ND¹	-	ND¹	-	ND¹	ND¹	ND¹	0.0096
	27-Feb-95	PTI	-	-	ND¹	ND¹	0.594	ND¹	ND¹	ND¹	-	ND¹	-	ND¹	ND¹	ND¹	ND¹
	24-Apr-96	GeoEngineers	-	-	ND¹	0.007	0.13	ND¹	ND¹	ND¹	-	ND¹	-	ND¹	ND¹	ND¹	ND¹
	2-Oct-98	HAI	-	-	-	0.0081	-	-	-	-	17.2	-	0.983	-	-	-	-
	13-Apr-99	HAI	-	-	-	-	-	-	-	-	0.572	-	0.209	-	-	-	-
	29-Jul-99	HAI	-	-	-	-	-	-	-	-	0.165	-	0.008	-	-	-	-
	19-Oct-99	HAI	-	-	-	-	-	-	-	-	1.11	-	0.197	-	-	-	-
MW-3	22-Oct-93	Century West	-	-	ND¹	ND¹	0.0091	ND¹	ND¹	ND¹	-	ND¹	-	ND¹	ND¹	ND¹	ND¹
	27-Feb-95	PTI	-	-	ND¹	ND¹	0.004	ND¹	ND¹	ND¹	-	ND¹	-	ND¹	ND¹	ND¹	0.0132
	24-Apr-96	GeoEngineers	-	-	ND¹	ND¹	ND¹	ND¹	ND¹	ND¹	-	ND¹	-	ND¹	ND¹	ND¹	ND¹
	2-Oct-98	HAI	-	-	-	0.0022	-	-	-	-	2.	-	0.493	-	-	-	-
	13-Apr-99	HAI	-	-	-	-	-	-	-	-	4.94	-	0.592	-	-	-	-
	29-Jul-99	HAI	-	-	-	-	-	-	-	-	4.82	-	0.593	-	-	-	-
	19-Oct-99	HAI	-	-	-	-	-	-	-	-	2.35	-	0.586	-	-	-	-
MW-4	22-Oct-93	Century West	-	-	ND¹	0.075	0.126	ND¹	ND¹	ND¹	-	ND¹	-	ND¹	ND¹	ND¹	ND¹
	27-Feb-95	PTI	-	-	ND¹	ND¹	0.0192	ND¹	ND¹	ND¹	-	ND¹	-	ND¹	ND¹	ND¹	0.019
	24-Apr-96	GeoEngineers	-	-	ND¹	ND¹	0.02	ND¹	ND¹	ND>.02	-	ND¹	-	ND¹	ND¹	ND¹	0.01
	2-Oct-98	HAI	-	-	-	0.0107	-	-	-	-	45.	-	8.05	-	-	-	-
	13-Apr-99	HAI	-	-	-	-	-	-	-	-	0.196	-	0.077	-	-	-	-
	29-Jul-99	HAI	-	-	-	-	-	-	-	-	17.8	-	8.	-	-	-	-
	19-Oct-99	HAI	-	-	-	-	-	-	-	-	72.1	-	7.29	-	-	-	-
		EPA MCLs -->	6.5 - 8.5	#	0.006	0.05	2.	0.005	0.1	1.	0.3	0.015	0.05	0.002	0.1	0.1	0.

Note:
= not established
- = not analyzed
EPA = U.S. Environmental Protection Agency
MCL = Maximum Contaminant Level

mg/l = milligrams/liter
ND = not detected above detection limit indicated
ppm = parts per million
Bold and shaded = Detected concentration exceeds reference level

1 = Detection Limit is 0.0002 mg/l
2 = Detection Limit is 0.001 mg/l
3 = Detection Limit is 0.002 mg/l

4 = Detection Limit is 0.003 mg/l
5 = Detection Limit is 0.005 mg/l
6 = Detection Limit is 0.010 mg/l

7 = Detection Limit is 0.020 mg/l
8 = Detection Limit is 0.025 mg/l
9 = Detection Limit is 0.050 mg/l

TABLE 12. ORGANOCHLORINE PESTICIDE AND PCB, CHLORINATED HERBICIDE, AND OIL & GREASE RESULTS FOR GROUNDWATER

	MW–1	MW–2	MW–3	MW–4	Rinsate Blank
Organochlorine Pesticides and PCBs (µg/L)					
Aldrin	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*
alpha–HCH	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*
beta–HCH	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*
delta–HCH	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*
gamma–HCH (Lindane)	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*
Chlordane (technical)	0.8 *U*	0.8 *U*	0.8 *U*	0.8 *U*	0.8 *U*
4,4'–DDE	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*
4,4'–DDD	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*
4,4'–DDT	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*
Dieldrin	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*
Endosulfan I	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*
Endosulfan II	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*
Endosulfan sulfate	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*
Endrin	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*
Endrin aldehyde	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*
Endrin ketone	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*	0.16 *U*
Heptachlor	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*
Heptachlor epoxide	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*	0.08 *U*
Methoxychlor	0.85 *U*	0.85 *U*	0.85 *U*	0.85 *U*	0.85 *U*
Toxaphene	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*
Aroclor™–1016	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*
Aroclor™–1221	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*
Aroclor™–1232	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*
Aroclor™–1242	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*
Aroclor™–1248	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*
Aroclor™–1254	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*
Aroclor™–1260	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*	1.0 *U*
Chlorinated Herbicides (µg/L)	MW–1	MW–2	MW–3	MW–4	
2,4–D	12 *U*	12 *U*	12 *U*	12 *U*	
2,4–DB	9 *U*	9 *U*	9 *U*	9 *U*	
2,4,5–T	2 *U*	2 *U*	2 *U*	2 *U*	
2,4,5–TP	2 *U*	2 *U*	2 *U*	2 *U*	
Dalapon	83 *U*	83 *U*	83 *U*	83 *U*	
Dicamba	3 *U*	3 *U*	3 *U*	3 *U*	
Dichloroprop	7 *U*	7 *U*	7 *U*	7 *U*	
Dinoseb	1 *U*	1 *U*	1 *U*	1 *U*	
MCPA	2500 *U*	2500 *U*	2500 *U*	2500 *U*	
MCPP	2500 *U*	2500 *U*	2500 *U*	2500 *U*	
Oil & Grease (mg/L)	MW–1	MW–2	MW–3	MW–4	
	5 *U*	5 *U*	5 *U*	5 *U*	

Note: PCB – polychlorinated biphenyl

Qualifier: *U* – undetected at detection limit shown

TABLE 13. VOLATILE ORGANIC COMPOUND RESULTS FOR GROUNDWATER

	MW–1	MW–2	MW–3	MW–4	Rinsate Blank	Trip Blank
Acetone	20 U	20 U	20 U	20 U	20 U	20 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	2 U	2 U	2 U	2 U	2 U	2 U
2–Butanone	20 U	20 U	20 U	20 U	20 U	20 U
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	2 U	2 U	2 U	2 U	2 U	2 U
2–Chloroethyl vinyl ether	2 U	2 U	2 U	2 U	2 U	2 U
Chloroform	1 U	1 U	1 U	1 U	3	4
Chloromethane	2 U	2 U	2 U	2 U	2	2 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U
1,2–Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U
1,2–Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
1,3–Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
1,4–Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	1 U
1,1–Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U
1,2–Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U
1,1–Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U
cis–1,2–Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U
trans–1,2–Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U
1,2–Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U
cis–1,2–Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U
trans–1,3–Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U
2–Hexanone	10 U	10 U	10 U	10 U	10 U	10 U
4–Methyl–2–pentanone	10 U	10 U	10 U	10 U	10 U	10 U
Dichloromethane	1 U	1 U	1 U	1 U	2	3
1,1,2,2–Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1–Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2–Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	1 U	1 U	1 U	1 U	1 U	1
Vinyl chloride	2 U	2 U	2 U	2 U	2 U	2 U
Total xylenes	1 U	1 U	1 U	1 U	1 U	1 U

Note: *Results reported in µg/L*

Qualifier: *U* – undetected at detection limit shown

Table 1
Groundwater Elevations
Terminal 5 Upland Facility

Monitoring Well	Top of Casing Elevation [ft]	Sample Date	Depth to Water [ft]	Groundwater Elevation [ft MSL]	Field Parameters					
					Temp [°C]	pH	EC [mS/cm]	DO [mg/L]	Turb [NTU]	ORP [mV]
MW-2	39.63	12/14/2005	9.27	30.36	12.76	6.56	0.317	0.06	3.79	-77.8
MW-3	41.17	12/14/2005	10.88	30.29	13.66	6.30	0.181	1.43	1.16	-31.3
MW-4	40.32	12/14/2005	8.10	32.22	12.11	6.10	0.411	2.17	12.3	15.1

Notes:
Field Parameters include Temperature, pH, Electroconductivity, Dissolved oxygen concentration, Turbidity, and Oxidation-reduction potential.

Table 1
Groundwater Level Measurements and Field Parameters
Terminal 5 Upland Facility

Monitoring Well	Top of Casing Elevation [ft]	Sample Date	Depth to Water [ft]	Groundwater Elevation [ft. MSL]	Field Parameters					
					Temp [°C]	pH	EC [mS/cm]	DO [mg/L]	Turb [NTU]	ORP [mV]
MW-2	39.63	12/14/2005	9.27	30.36	12.76	6.56	0.317	0.06	3.79	-77.8
MW-3	41.17	12/14/2005	10.88	30.29	13.66	6.30	0.181	1.43	1.16	-31.3
MW-4	40.32	12/14/2005	8.10	32.22	12.11	6.10	0.411	2.17	12.3	15.1

Notes:
Field Parameters include Temperature, pH, Electroconductivity, Dissolved oxygen concentration, Turbidity, and Oxidation-reduction potential.

Table 2
Summary of Groundwater Analytical Results
Terminal 5 Upland Facility

Monitoring Well	Sample Date	Analyte Concentration in mg/L (ppm)					
		Total Recoverable Metals			Dissolved Metals		
		Barium	Iron	Manganese	Barium	Iron	Manganese
MW-2	10/22/1993	2.03	--	--	0.18	--	--
	2/27/1995	0.101	--	--	0.594	--	--
	4/24/1996	1.69	--	--	0.13	--	--
	10/2/1998	0.0641	16.5	0.924	--	17.2	0.983
	4/13/1999	0.0313	2.37	0.293	--	0.672	0.209
	7/29/1999	0.0145	0.85	0.097	--	0.165	0.068
	10/19/1999	0.0236	1.88	0.235	--	1.11	0.197
	12/14/2005	0.095	2.8	0.76	0.091	3.2	0.79
MW-3	10/22/1993	0.234	--	--	0.0091	--	--
	2/27/1995	0.0079	--	--	0.004	--	--
	4/24/1996	0.12	--	--	0.010 U	--	--
	10/2/1998	0.0091	3.06	0.506	--	2	0.493
	4/13/1999	0.0185	5	0.608	--	4.94	0.592
	7/29/1999	0.0132	6.95	0.57	--	4.82	0.595
	10/19/1999	0.0105	3.4	0.572	--	3.35	0.586
	12/14/2005	0.012	2.7	0.56	0.0092	1.7	0.48
MW-4	10/22/1993	0.949	--	--	0.126	--	--
	2/27/1995	0.0513	--	--	0.019	--	--
	4/24/1996	0.09	--	--	0.020	--	--
	10/2/1998	0.0898	41.6	7.85	--	45	8.05
	4/13/1999	0.0133	1.63	0.084	--	0.198	0.077
	7/29/1999	0.0405	7.97	1.19	--	17.8	3
	10/19/2005	0.0896	71.8	7.4	--	72.1	7.29
	12/14/2005	0.051	1.7	0.52	0.040	1.0	0.49
DEQ Aquatic SLV					0.004	1.0	0.12

Notes:
-- = Compound not included in analysis
U = Compound not detected at listed reporting limit.
B = Compound was detected in laboratory blank.
SLV = Oregon DEQ Level II Screening Level Values for Aquatic Surface Water Receptors.

Appendix B

Site Preload Grading Specification & Notes
Canpotex Bulk Potash Facility Expansion
Kleinfelder, November 29, 2005

Canpotex Bulk Potash Facility Expansion
Portland Bulk Terminals LLC, at Port of Portland Terminal 5

Site Preload Grading Specification & Notes

Background Information

The building footprint of the proposed addition to the Canpotex bulk potash storage facility at Portland Bulk Terminals LLC, Terminal 5, Port of Portland, is to be preloaded with earth fill in order to cause a portion of the anticipated settlement of the site subsoils beneath the loads due to the proposed building to occur before the building is constructed.

It is anticipated that the site preload will require 6 to 8 months total calendar time, from beginning of placing the fill until beginning of removal. It is also anticipated that placing of the preload fill will be accomplished in stages, over a period of two to three months.

For purposes of this contract, project completion will be deemed to occur on the date on which the Geotechnical Engineer of Record determines that sufficient settlement has occurred beneath the preload fill to allow removal of the fill and subsequent construction of the building addition.

Demolition Specifications

1. Contractor shall remove and dispose of the following items related to the abandoned railroad berm shown on Figure 2 as "Primary Borrow Area No. 1", prior to utilizing the materials in the berm as preload fill.

    - Approximately 2000 lineal feet of cable trays and cable tray covers. Removal of the electrical cable itself is not in this contract (NIC), but will be performed previously by others.
    - Steel structure supporting the cable trays.
    - Several hundred creosote-treated railroad ties. These shall be removed from their present location and neatly stacked in an on-site location designated by Portland Bulk Terminals for later disposition by others.

    Contractor shall provide for recycling the metal items, including transportation to a suitable recycling center, and shall provide a credit to Owner for any net value received for these items.

Site Preload Grading Specifications:

1. The site preload shall be constructed, maintained, and monitored in accordance with these specifications and with the recommendations presented in the Geotechnical Investigation Report by Squier | Kleinfelder, dated October 4, 2005, Squier | Kleinfelder Project # 60266, hereinafter referred to as the GIR. Copies of this report are available from the Beaverton, Oregon Office of Squier | Kleinfelder.

2. The site preload shall be constructed by the contractor in the location and to the dimensions as shown in plan view on Figures 2 and 3, "Preload Fill and Site Grading Plan" and cross sections as shown on Figure 4, "Site Preload and Erosion Control Details".

3. Removal of the preload fill is not included in this contract (NIC).

4. The pile of soil presently in place on the northern portion of the building expansion site, as shown on Figures 2 & 3, may, at contractor's discretion, be left in-place and incorporated "as-is" into the site preload program, or it may be spread out and leveled on the remaining portion of the site preload area, to provide a uniform height of preload fill, prior to incorporating additional fill onto the preload.

5. The site preload shall be constructed in horizontal stages, with no more than 10 vertical feet of new preload fill allowed in any one stage, unless and until the Geotechnical Engineer of Record has determined that the subsoils beneath the preload fill have consolidated sufficiently to prevent bearing capacity failures, before placing additional height of preload fill. *The contractor should anticipate waiting periods of one week to several weeks between stages.*

6. Overhead 115KV line. There is an existing 115 KV transmission line crossing the area of the preload fill in a general east-west direction. The minimum height of this line is approximately 37 feet above present grade. This 115 KV line will be relocated by others prior to or during the course of placing the preload fill. Relocation of the 115KV line is not included in this contract (NIC). It is anticipated that the first 10-foot lift of the preload fill may need to be constructed with this line still in place, but that the line will be relocated in a timely manner so as to not impede construction of the preload fill to its final height. Contractor shall maintain separation from this line of all construction equipment as per NEC and all other applicable electrical codes.

7. Prior to placing any preload fill, the area to be preloaded shall be stripped to remove surface soils and vegetation, as recommended in the GIR. The Geotechnical Engineer of Record shall verify that stripping is adequate prior to placing any fill on the preload area.

8. Fill materials for the site preload shall be obtained from the abandoned railroad siding berm on the northwest (Willamette River) side of the existing bulk storage terminal, and which is designated as Borrow Area No. 1, as shown on Figure 2 , "Preload and Site Grading Plan". At such time as the fill materials from the railroad berm in Borrow Area No. 1 are depleted to the elevation of the adjacent surface grade, no additional materials from Borrow Area No. 1 shall be removed. In the event that the available materials from Borrow Area No. 1 prove to be insufficient in quantity, materials from Borrow Area No. 2 may be utilized as approved and directed by Portland Bulk Terminals.

9. Ballast rock from the abandoned railroad spur in Borrow Area No. 1 shall be utilized by the contractor to provide a working surface for the haul roads between the borrow areas and the preload fill site.

10. The first 12 vertical inches minimum of preload fill (or until the ballast rock material from Borrow Area No. 1 is exhausted) shall consist of ballast rock stripped and transported by the contractor from the top and sides of the abandoned railroad track berm in Borrow Area No. 1, for use as a building pad and as an aid in maintaining earthwork operations during wet weather.

11. Stripped topsoil, organic soils or other deleterious materials from Borrow Area No. 1 or No. 2 shall not be utilized as preload fill material. The contractor shall dispose of such materials by placing them evenly in a horizontal layer not to exceed 4 inches in height, at the disposal location indicated on Figure 2.

12. The preload fill shall be constructed by placing approved fill materials in horizontal lifts not exceeding 12 inches in finished height. It is necessary only to lightly compact the preload fill in lifts, by rolling or by passage of the heavy construction equipment placing the fill, compacted sufficiently to maintain a working surface that will support the construction equipment.

13. The site preload and all other earthwork operations pertaining thereto shall be constructed and maintained in accordance with the Erosion Control Plan and as specified in the City of Portland Grading Permit issued for this development.

14. Settlement monitors, located as shown on in plan view on Figure 3, and in detail on Figure 4, shall be provided and installed by and maintained by the contractor as a scope of work item. Other types of settlement monitors or settlement instrumentation approved in advance by the Geotechnical Engineer of Record may be substituted. The contractor shall be responsible for maintaining the settlement monitors for the duration of the preload period, including replacing settlement monitors destroyed, damaged, or disturbed by construction activities associated with the preload fill. Contractor shall bear the cost of obtaining any and all additional settlement surveys due to any such destruction, damage, or disturbance to the settlement monitors during the preload period.

    Monitoring and reporting data from the settlement monitors is not included in this contract (NIC). Monitoring of settlement monitors will be performed by a professional land surveyor registered in the state of Oregon, under a separate contract with Portland Bulk Terminals. Contractor shall provide reasonable accommodations to the surveyor to obtain readings on the settlement monitors. Settlement monitors shall be surveyed weekly and the results of the surveys conveyed to the Geotechnical Engineer of Record.

15. Site preload operations will be reviewed periodically by the Geotechnical Engineer of Record to determine that the intent and desired results of the preload are accomplished. The Geotechnical Engineer of Record shall have the authority to limit the height and extent of the preload fill until sufficient consolidation and settlement of the subsurface soils has occurred, prior to extending the preload fill to intermediate heights and to its final design height, such authority being subject to approval by Portland Bulk Terminals. Determination of duration of the preload will also be by the Geotechnical Engineer of Record, subject to review and approval by Portland Bulk Terminals.

16. No on-site soils shall be removed from the premises without the permission of Portland Bulk Terminals.

17. There is an existing 18" CMP drainage pipe draining generally east to west beneath the preload fill area, and located as shown on Figures 2 & 3. This CMP drain is expected to be rendered non-functional by settlement induced by the preload fill. Contractor shall remove and dispose of that portion of this CMP lying beneath the site preload area, as shown on Figures 2 and 3, prior to placing preload fill.

18. In addition to the 18" CMP described in the preceding paragraph, there is also another existing drainage ditch running generally east to west across the area of the site preload, as shown on Figures 2 and 3. The portion of this ditch lying beneath the preload fill shall be filled in by the contractor as part of constructing the preload fill.

19. Runoff that was previously carried across the site preload area by the removed 18" CMP and by the existing drainage ditch, as described in the two preceding paragraphs, shall be temporarily rerouted around the east and south sides of the preload area utilizing a new, temporary ditch to be constructed by Contractor for this purpose. This temporary ditch shall be extended northward on the west side of the preload fill area to connect with the existing drainage ditch on the west side of the site preload, as shown in Figures 2 and 3. This temporary ditch around the site preload shall be constructed so as to provide positive drainage around the preload area and shall have side slopes not exceeding 1.5H to 1V.

20. Permanent storm water conveyance will be by others and is not included in this contract (NIC).

21. Protection of monitoring wells. There are at least two water-level monitoring wells in the vicinity of the project, as noted on Figure 2 with notations ending in "MW". Contractor shall protect all monitoring wells from damage for the duration of the preload activities.

22. Conformance with these requirements does not relieve the contractor of the obligation to comply with all applicable OSHA, state, and local government rules and regulations.

Erosion Control and Sedimentation Control Plan and Specifications

1. There is no net gain or loss of area of impervious surface and no net gain or loss of fill to or from the site associated with the site preload.

2. The contractor shall be responsible for proper installation, maintenance, and operation of all erosion protection and sediment control measures in accordance with all applicable federal, state, and local regulations, including the City of Portland *Water Quality and Erosion Control Manual.* Contractor's responsibility under this clause extends until "Project Completion, which is defined as such time as the preload fill is declared ready for removal by the Geotechnical Engineer of Record and Portland Bulk Terminals.

3. The existing bulk storage facility operates under a permit limiting TSS (total suspended solids) discharge into the Willamette River. Any and all construction activities and erosion and control measures related to placing of the preload fill must not cause the TSS limits of the existing operating permit to be exceeded.

4. This erosion control and sedimentation control plan is intended to be used as a guide to control the transportation of mud and/or dirt that might cause water quality or nuisance problems outside of the property, and to prevent the entry of sediment-bearing water into the drainage system.

5. All erosion control and sedimentation control measures must be coordinated with construction activities in such a manner as to ensure that sediment-bearing water does not enter the drainage system or violate applicable water quality control standards.

6. The measures specified herein constitute the minimum standards to which the contractor must adhere for anticipated site conditions. During the construction and site preload period, it is the responsibility of the contractor to implement and maintain all erosion control and sedimentation control measures such that sediment-bearing water does not leave the site.

7. Straw bales and other straw products are prohibited on the premises. This is an AQIS facility, and as such, the presence of seeds or grains are prohibited in any amount in the potash products shipped from the facility. Seeds and grains are not allowed on the premises. Therefore, straw bales (which might contain seeds) are prohibited. Bark mulch bags ("bio-bags") or other approved sediment control products shall be utilized in lieu of straw bales as an erosion control measure.

8. Approval of this erosion control and sedimentation control plan does not constitute approval of any permanent road or drainage features.

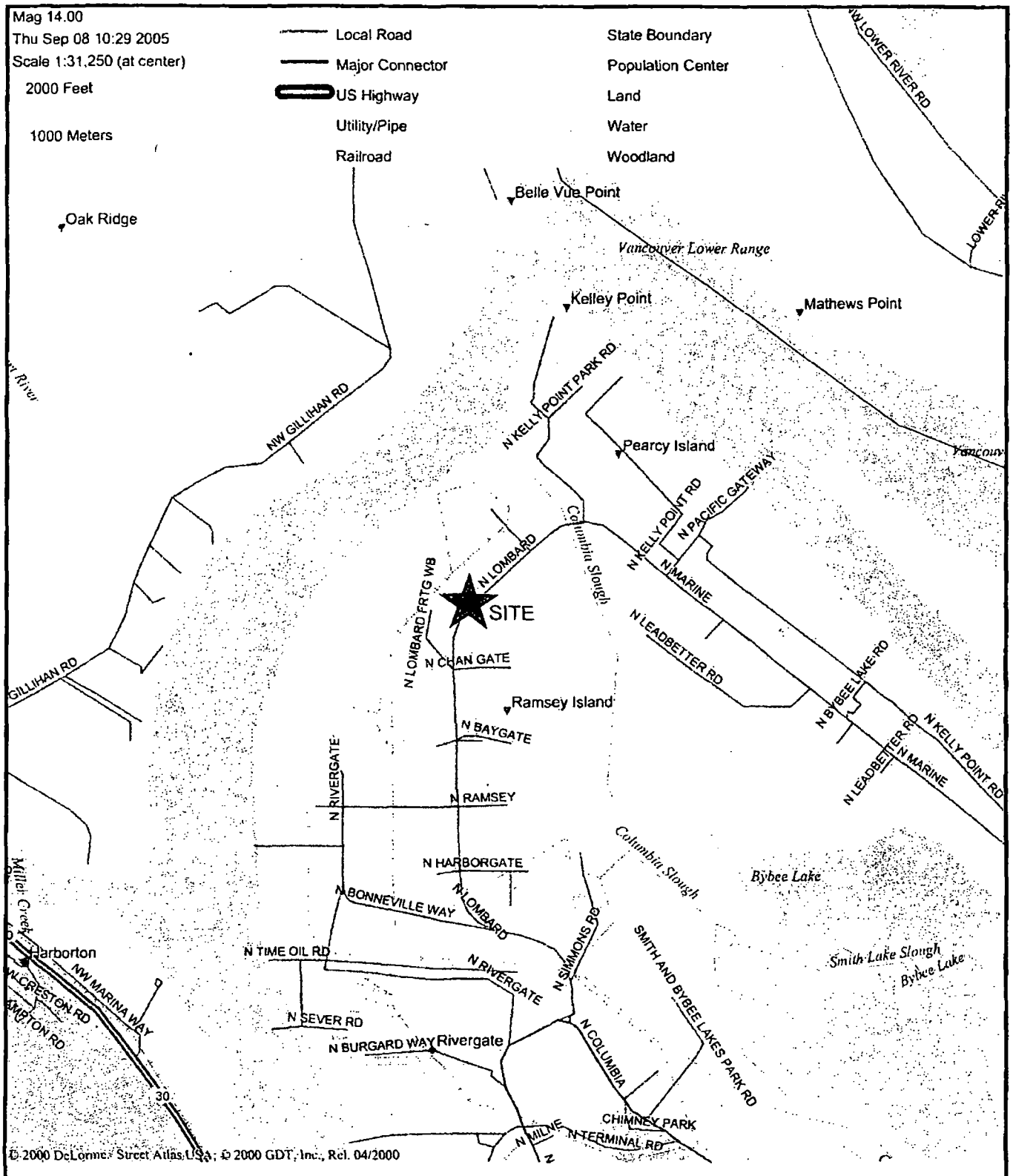
9. As a minimum, silt fences shall be provided in the locations indicated on Figures 2 & 3. Silt fences shall be maintained in a functional condition throughout the duration of the contract. The silt fences shall be constructed as shown as in the details on Figure 4, or alternate details approved in advance by the City of Portland. Openings in the silt fences to accommodate earthmoving construction traffic shall be limited to the minimum opening necessary to conduct earthmoving operations, and as openings become unnecessary, the silt fences in the unused openings should be restored to the design condition. Additional silt fences may be required as fill is moved from the borrow areas onto the preload fill.

10. Silt fences and other temporary erosion control measures shall be left in-place following the completion of placing the preload fill. Any damaged areas of silt fence shall be replaced or restored to original design condition following completion of placing of the preload fill. Silt fences shall remain in place until *removal* of the preload fill is complete. Contractor shall maintain all sediment and erosion control measures throughout the duration of the preload fill. Final removal of silt fences is not included in the contract (NIC).

11. At no time shall sediment be allowed to accumulate more than one-third of the height of any silt fence or other sediment control barrier. Waste materials and spoils shall be placed on-site in areas as directed by Portland Bulk Terminals, and in such fashion as to not cause further erosion.

12. All erosion control and sedimentation control measures shall be inspected and maintained by contractor on a daily basis to ensure their continued effectiveness.

13. Contractor shall furnish and install a vehicle tracking pad where construction equipment egresses the facility. The location of construction equipment ingress and egress shall be as dictated by Portland Bulk Terminals. The vehicle tracking pad shall be at least 100 feet in length, with width equal to the width of the egress opening plus ten feet on each side. The vehicle tracking pad shall be constructed with a minimum thickness of 8 inches of 1-inch to 3-inch clean, open-graded rock, underlain by an approved geotextile barrier.



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VICINITY MAP

PORTLAND BULK TERMINALS LLC

PROPOSED ADDITION TO BULK POTASH STORAGE FACILITY

PORTLAND, OREGON

PROJECT # 63827

FIGURE 1

PORTLAND BULK TERMINALS LEASEHOLD BOUNDARY

SILT FENCE

STRIPPED TOPSOIL DEPOSIT AREA

EXISTING POND

EXISTING DRAINAGE DITCH

PRIMARY BORROW AREA NO. 1

SILT FENCE

18" CMP
REMOVE AND DISPOSE
SEE SITE PRELOAD GRADING SPECIFICATIONS

A'

PROPOSED BUILDING FOOTPRINT

BUILDING COLUMNS

BUILDING

A

FILL IN EXISTING DRAINAGE AREA

6718
3447
MW

ALTERNATE BORROW AREA NO. 2

SILT FENCE (SILT FENCE NEEDED ONLY IF BORROW AREA USED)

6878
3258
MW

PORTLAND BULK TERMINALS LEASEHOLD BOUNDARY

SITE TOPOGRAPHY BY W&H PACIFIC 11/3/2005

APPLICANT:
GENE ELLIS
PORTLAND BULK TERMINALS LLC
15550 LOMBARD, TERMINAL 5
PORTLAND, OR 97203
PHONE: 503-285-4200
FAX: 503-284-7733

OWNER:
PORT OF PORTLAND
121 NW EVERETT ST
PORTLAND, OREGON 97209
PHONE: 503-944-7000
FAX: 503-944-7080

ZONING:
BASE ZONE: IH
OVERLAY ZONE: I

CONTACT:
RACHAEL BRAKE
WESTMAR CONSULTANTS CORP
6601 NE 78TH COURT
SUITE A1
PORTLAND, OR 97218
PHONE: 503-256-7670
FAX: 503-256-8587

PROJECT ADDRESS:
15550 N LOMBARD TERMINAL 5
PORTLAND, OR 97203

AREA:
140.97 ACRES
PERCENT STRUCTURES: 4%
PERCENT LANDSCAPING: 1 ½ %
ADDITIONAL IMPERVIOUS: 0

LEGEND

W&H SYMBOLOGY

- BLOW OFF
- CULVERT
- GUY ANCHOR
- HYDRANT
- WATER METER
- WATER VALVE
- POLE
- BUILDING FOOTPRINT
- BUILDING PROJECTION
- GRAVEL
- OVERHEAD POWER LINE
- MINOR CONTOUR
- MAJOR CONTOUR

PORT OF PORTLAND SYMBOLOGY

- FENCE
- ELECTRICAL LINE
- STORM SEWER LINE
- C CULVERT

N

SCALE
200 0 100 200 400
(FEET)
1" = 200'

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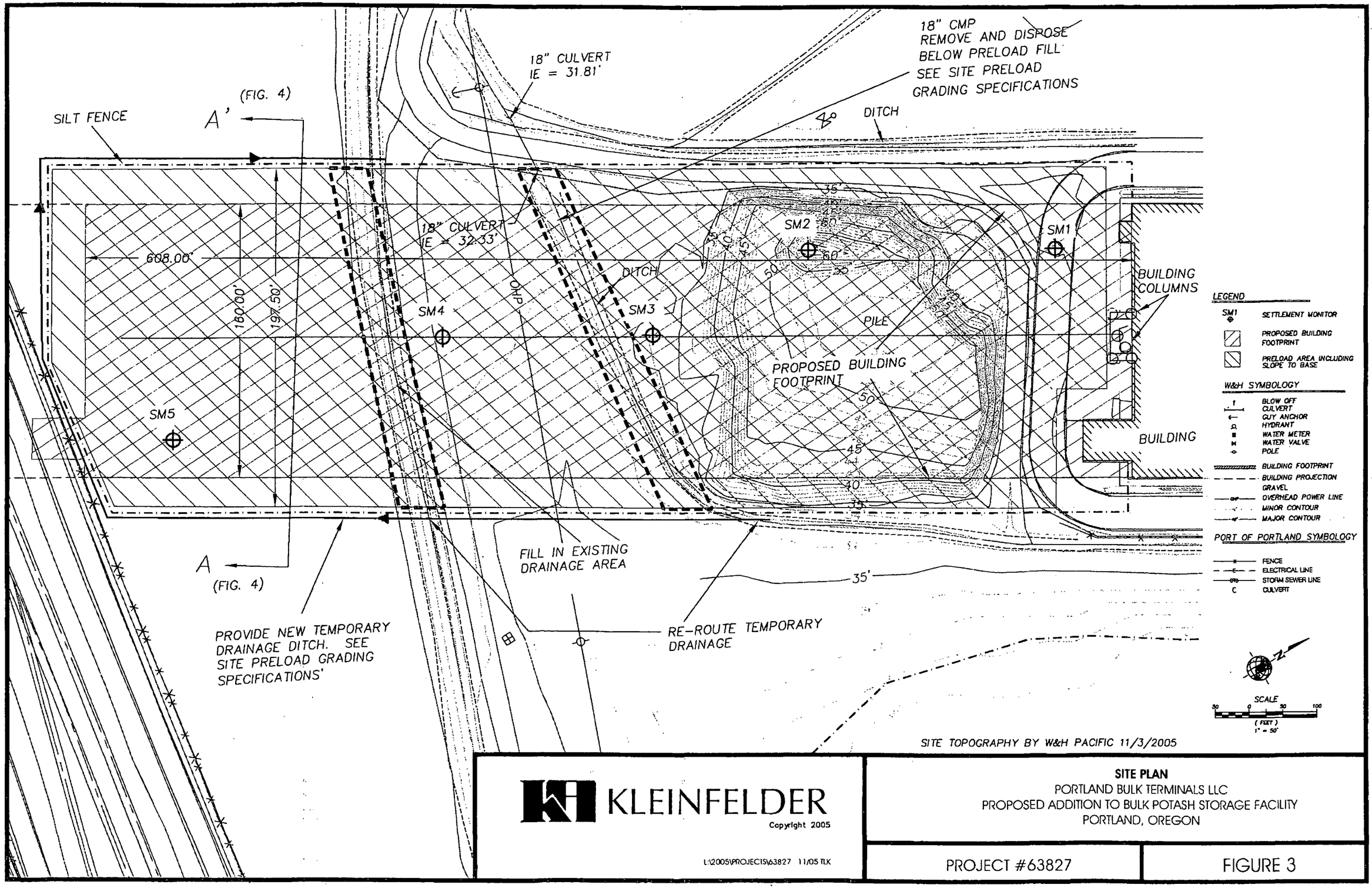
SITE PLAN
PORTLAND BULK TERMINALS LLC
PROPOSED ADDITION TO BULK POTASH STORAGE FACILITY
PORTLAND, OREGON

PROJECT #63827

FIGURE 2



SITE TOPOGRAPHY BY W&H PACIFIC 11/3/2005

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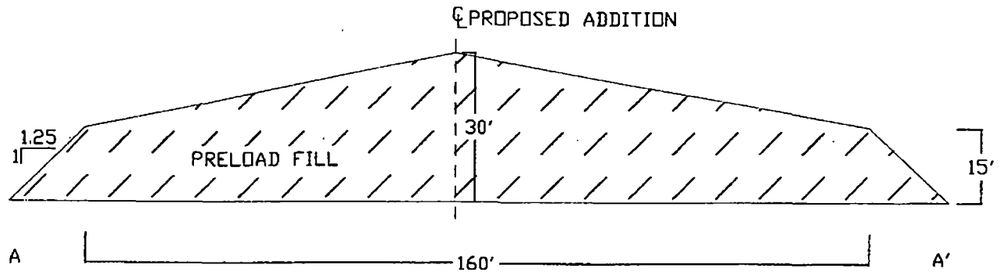
SITE PLAN
PORTLAND BULK TERMINALS LLC
PROPOSED ADDITION TO BULK POTASH STORAGE FACILITY
PORTLAND, OREGON

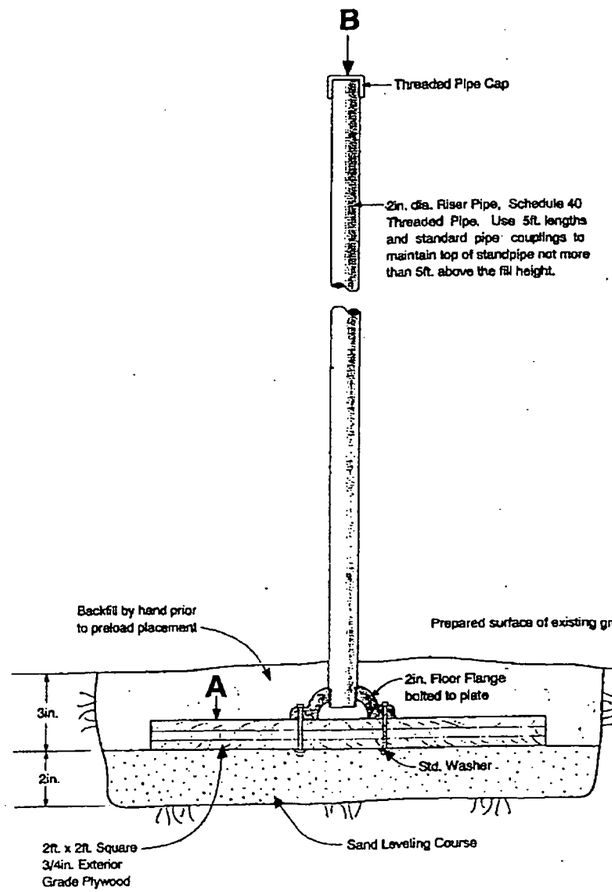
PROJECT #63827

FIGURE 3

SITE PRELOAD CROSS SECTION DETAIL

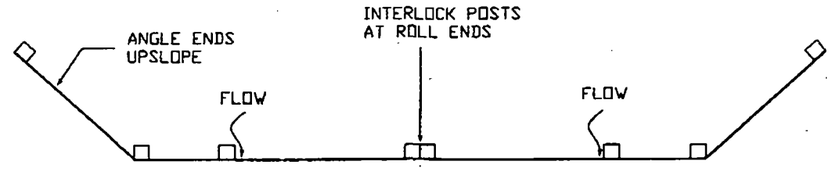


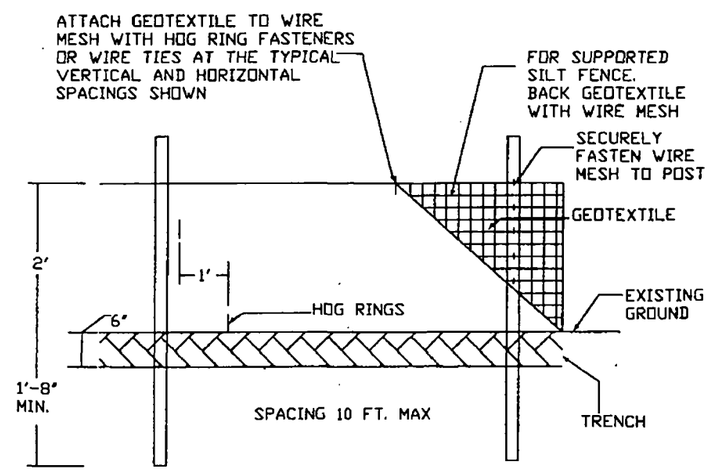
SCALE: 1" = 30'



SETTLEMENT PLATE INSTALLATION

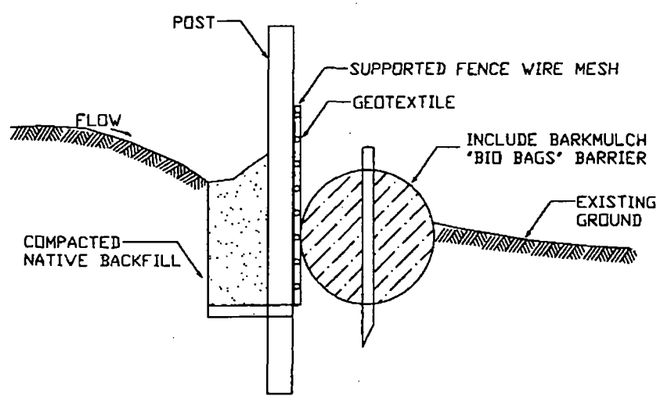
SCALE: NTS





SILT FENCE DETAIL

SCALE: NTS



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SITE PRELOAD AND EROSION CONTROL DETAILS
PORTLAND BULK TERMINALS LLC
PROPOSED ADDITION TO BULK POTASH STORAGE FACILITY
PORTLAND, OREGON

PROJECT #63827

FIGURE 4